

Hiroshi IIZUKA* & Junta SUGIYAMA**: On three new
Aspergilli isolated from Kuro-koji of Ryukyu
 Islands and Kagoshima, Japan

飯塚 広*・杉山純多**: 琉球及び鹿児島産 *Aspergillus* の
 2 新種, 1 新変種について

(Pl. VIII—IX)

In order to validate *Aspergillus saitoi* Sakaguchi, Iizuka et Yamazaki, *A. saitoi* var. *kagoshimaensis* Sakaguchi, Iizuka et Yamazaki and *A. usanii* Sakaguchi, Iizuka et Yamazaki, which were published in Japanese in 1950, the Latin diagnoses are provided here. The members of the black *Aspergillus* were divided into two groups by Sakaguchi, Iizuka and Yamazaki (1949 a & b, 1950 a & b, 1951): first, the *A. niger* group in which conidial walls are with bars colored or conspicuously echinulate when matured, and secondly, the Kuro-koji molds group of *Aspergillus* in which conidial walls are smooth, rough or rarely echinulate and also nitrites in most cases assimilated in young culture. In the Kuro-koji group color of the conidial heads varies from species to species, for example, such as in shades of black, olive or brown. Three new *Aspergilli*, which are described here belongs to the Kuro-koji molds group with black colored conidial heads. The assimilation of nitrites was tested by the use of Sakaguchi and Wang's agar medium: sucrose, 30 g; NaNO₂, 1.5 g; K₂HPO₄, 1 g; KCl, 0.5 g; MgSO₄·7H₂O, 0.5 g; FeSO₄, 0.01 g; and distilled water, 1000 ml (Sakaguchi and Wang, 1934). The color descriptions are made based on Ridgway's Color Standards and Color Nomenclature (Ridgway, 1912).

1. *Aspergillus saitoi* Sakaguchi, Iizuka et Yamazaki [in Journ. Appl. Mycol. (Sapporo) 4: 2 (1950), sine descr. latin.] Fig. 1.

Coloniae in agaro Czapekii cito crescentes, evadentes fusco-flavae per olivario-flavas; saepe hyphae aereae albae producentes; raro sclerotiae producentes, ovatae, pallide puniceae, ca. 2 mm longae; peritheciis ignotis; capitulae conidialiae globosae, 140–500 μ , plerumque ca. 350 μ in diametro; facies obscura alba. Conidiophori emergentes e substrato, 4 mm longi, 10–23 μ in diametro.

* Institute of Applied Microbiology, University of Tokyo, Bunkyo-ku, Tokyo. 東京大学応用微生物研究所.

** Department of Botany, Faculty of Science, University of Tokyo, Bunkyo-ku, Tokyo. 東京大学理学部植物学教室.

Vesiculae globosae, 34–80 μ in diametro, fertiles in toto facie superiore. Sterigmata, biseriata, primariis 10–25 \times 3.6–8 μ ; secundariis 6–10.7 \times 2.2–4 μ . Conidia globosa, vulgo aspera, 2.7–4.5 μ in diametro. HNO₂ non assimilatur in culturis primo.

Typus: cultura in tubo no. R-6711.

Colonies on Czapek agar growing rapidly, becoming Blackish Brown (3) XLV through Olive Brown XL; occasionally white aerial hyphae produced; rarely sclerotia produced, oval, pale pink, up to 2 mm in long axis; but perithecia not observed; conidial heads globose, ranging from 140–500 μ in diam., almost about 350 μ in diam.; reverse in shades of white. Conidiophores rising from the substratum, up to 4 mm long by 10 to 23 μ in diam. Vesicles globose, ranging from 34 to 80 μ in diam., fertile over the entire surface. Sterigmata in two series; primary sterigmata cuneate, 10–25 \times 3.6–8 μ ; secondary sterigmata 6–10.7 \times 2.2–4 μ . Conidia globose, rough, 2.7–4.5 μ in diam. Nitrites not assimilated in young culture.

Isolated from Kuro-koji (mouldy materials), which is used for manufacturing sweet potato distilled wine, Kiobu Brewery, Shuri, Ryukyu Islands (collected by K. Sakaguchi, 17. Apr. 1935). The living type culture and type specimen (as no. IAM 2209) are preserved at the Institute of Applied Microbiology, University of Tokyo, Tokyo.

Morphological characteristics of *A. saitoi* here under study reveals a similarity to *A. usamii*, but is markedly different from the latter in nitrites not assimilated in young culture and in having colorless mycelium.

2. *Aspergillus saitoi* Sakaguchi, Iizuka et Yamazaki var. *kagoshimaensis* Sakaguchi, Iizuka et Yamazaki [in Journ. Appl. Mycol. (Sapporo) 4: 3 (1950), sine descr. latin.] Fig. 2. A–C.

A typo differt capitulis conidialibus globosis, minoribus, 200–300 μ in diametro, conidiophoribus brevioribus, 1000–1500 μ longis, 12–30 μ in diametro.

Typus: cultura in tubo no. K-3931.

Conidial heads globose, smaller than *A. saitoi*, ranging from 200–300 μ in diam. Colonies on Czapek agar Dark Olive at first through Saccardo' Olive, then becoming Blackish Brown (3) XLV with the development of conidial structures. Conidiophores short, up to 1000 to 1500 μ long by 12 to 30 μ in diam. Vesicles globose, 30 to 63 μ in diam. Sterigmata in two series; primary sterigmata 7.2–15 \times 3–6.3 μ , secondary sterigmata 6–9 \times 3–3.5 μ . Conidia globose, rough, 3.5–5.5 μ

in diam.

Isolated from Kuro-koji, T. Nakamura Brewery, Kagoshima Pref., Japan (collected by K. Sakaguchi, May 1935). The living type culture and type specimen (as no. IAM 2190) are preserved at the Institute of Applied Microbiology, University of Tokyo, Tokyo.

3. **Aspergillus usamii** Sakaguchi, Iizuka et Yamazaki [in Journ. Appl. Mycol. (Sapporo) 4: 1 (1950), sine descr. latin.] Fig. 2. D-F.

Coloniae in agar Czapekii valde cito diffusae, primo flavae (Empire Yellow IV to Lemon Chrome IV), cum evadentes fusco-flavae cum formatio conidiorum incipit; capitulae conidialiae fulvae, 250-500 μ in diametro post dies 3; mycelium vegetativum fluvum; hyphae aerae tenuiter producentes; facies oboersa pallide flavo-fluva. Conidiophori 5 mm longi, 14.5-25 μ in diametro, emergentes e substrato, apice flavo-fluva. Vesiculae globosae, 50-70 μ in diametro, fertiles in toto facie superiore. Sterigmata biseriata, primariis 10.7-20 \times 5-8 μ , plerumque 15 μ longis, 3 μ in diametro; secundariis 7.2-9 \times 3-4 μ , plerumque 8 μ longi, 3 μ in diametro. Conidia globosa, vulgoaspera, 3.5-5.5 μ in diametro, plerumque 4 μ in diametro. Neque sclerotia neque perithecia animadversa sunt.

Typus: cultura in tubo no. R-0635.

Colonies on Czapek agar spreading very rapidly, at first Empire Yellow IV or Lemon Chrome IV, then becoming Blackish Brown(3)XIV with the development of conidial structures; conidial heads in shades of Mummy Brown IV, ranging from 250 to 500 μ in diam. after 3 days; vegetative mycelium yellow; aerial hyphae produced scantily; reverse in shades of pale yellowish brown. Conidiophores rising from the substratum, up to 5 mm long, by 14.5 to 25 μ in diam., yellowish brown at its apex. Vesicles globose, ranging from 50 to 70 μ in diam., fertile over the entire surface. Sterigmata in two series; primary sterigmata 10.7-20 \times 5-8 μ , almost 15 μ long by 5.5 μ in diam.; secondary sterigmata 7.2-9 \times 3-4 μ , almost 8 μ long by 3 μ in diam. Conidia globose, mostly roughened, 3.5-5.5 μ , almost 4 μ in diam. Neither sclerotia nor perithecia have been observed.

Isolated from Kuro-koji, S. Sasamoto Brewery, Shuri, Ryukyu Islands (collected by K. Sakaguchi, 17. Apr. 1935). The living type culture and type specimen (as no. IAM 2185) are preserved at the Institute of Applied Microbiology, University of Tokyo, Tokyo.

The present fungus, *A. usamii*, is related to *A. batatae* Saito (Saito, 1907),

but the sterigmata of the former are characteristically shorter than those of the latter. *A. usamii* also differs from *A. batatae* in pigmentation, i.e., the colonies of the former are yellowish in color but those of the latter colorless.

The junior author expresses his cordial gratitude to Prof. H. Hara of the Department of Botany, Faculty of Science, University of Tokyo, for his kind guidance and also to Mr. T. Watanuki of Kanagawa Prefectural Youth Center, Yokohama, for kindly supplying electron photomicrographs.

Explanation of the plates VIII-IX

Fig. 1. *Aspergillussaitoi*; no. R-6711. A & B, Typical conidial head showing form of vesicle and arrangement of sterigmata. C, conidia. D, Electron micrograph of conidia.

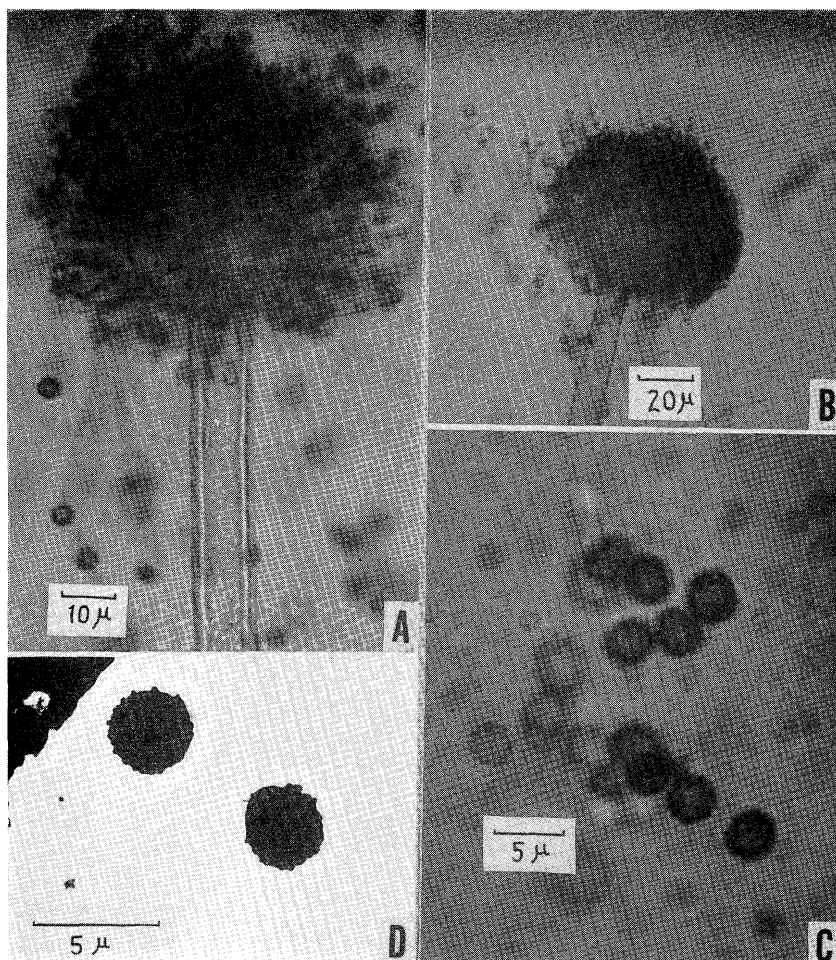
Fig. 2. *Aspergillussaitoi* var. *kagoshimaensis*; no. K-3931. A, Typical conidial heads showing form of vesicle and arrangement of sterigmata, and conidiophores. B, Conidia. C, Electron micrograph of conidia. *Aspergillususamii*; R-0635. D, Typical conidial heads and conidiophores. E, Conidia. F, Electron micrograph of conidium.

References

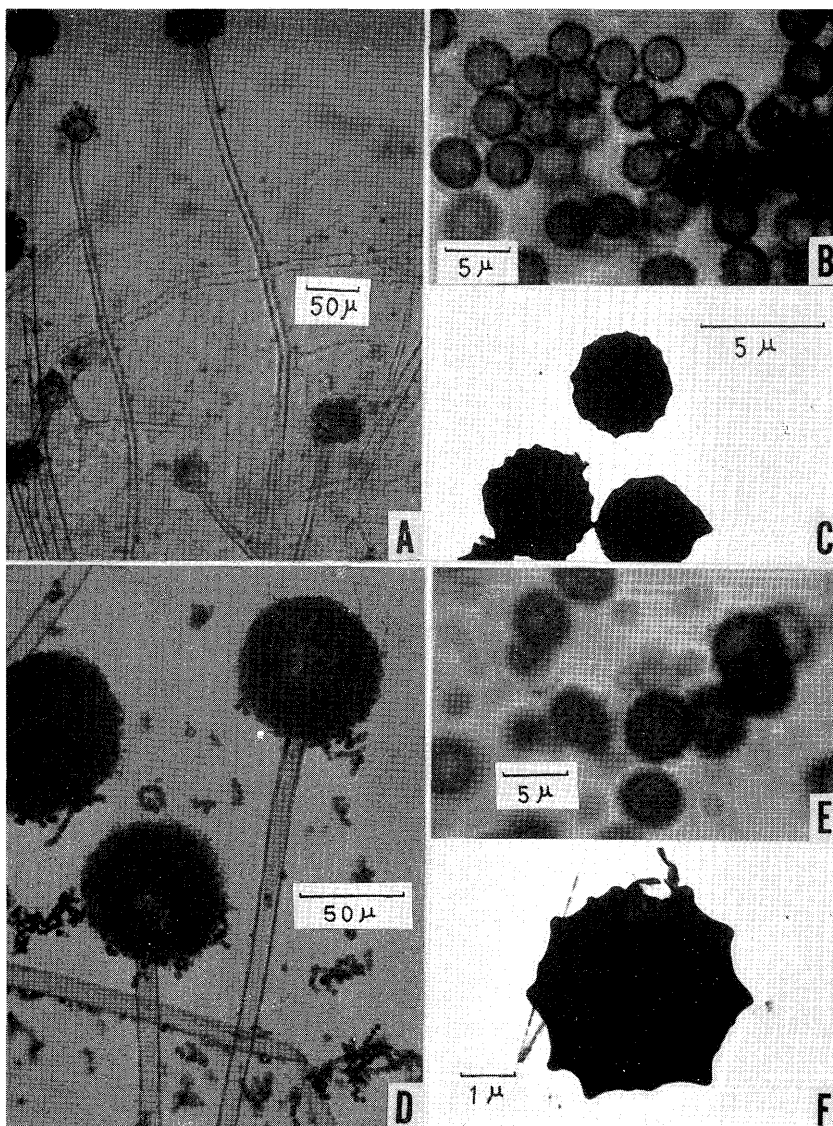
- Ridgway, R. (1912) Color Standards and Color Nomenclature, Washington, D.C. Saito, K. (1907) Mikrobiologische Studien über die Zubereitung des Bata-tenbranntweines auf der Insel Hachijo (Japan). Centralb. f. Bakt. Abt. 2, **18**: 30-37. Sakaguchi, K., Iizuka, H. & Yamazaki, S. (1949 a & b, 1950 a & b, 1951) A study on black *Aspergilli* (1)-(5). Journ. Appl. Mycol. (Sapporo) **3**: 53-63; **3**: 65-72; **3**: 97-104; **4**: 1-13; Journ. Agr. Chem. Soc. Japan **24**: 138-142 (in Japanese with English summary). Sakaguchi, K. & Wang, E. (1934) On the assimilation of nitrites in fungi (1). Journ. Agr. Chem. Soc. Japan **10**: 459-476 (in Japanese).

* * * *

琉球及び鹿児島産の *Aspergillus* 属に属するいわゆる黒麹菌 (the Kuro-koji moulds of *Aspergillus*), *A. saitoi*, *A. saitoi* var. *kagoshimaensis*, *A. usamii* が新種, 新変種として 1950 年に坂口, 飯塚, 山崎によって報告されたが, ラテン語記載がないため今回これらの菌種について詳細に観察して, 足らざるところを補ってラテン語記載を附した。又特に black *Aspergilli* の分類上, 亜硝酸塩同化能が重要な分類基準となることを再確認した。



H. IZUKA & J. SUGIYAMA: New *Aspergilli* from Kuro-koji



H. IIZUKA & J. SUGIYAMA: New *Aspergilli* from Kuro-koji